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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,293	04/27/2007	**Manfred Danziger**	102133-16	6840

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
1787	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/589,293	DANZIGER, MANFRED	
	Examiner	Art Unit	
	Ramsey Zacharia	1787	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 10-26* is/are pending in the application.

4a) Of the above claim(s) *3,4,13-24 and 26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,10-12 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

2. Claims 16-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 13 April 2010.

3. Applicant's election with traverse of species (a) in the reply filed on 13 April 2010 is acknowledged.

Claim Rejections - 35 USC § 112

4. Claims 1, 2, 10-12, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "low active surface energy" in independent claims 1 and 10 is a relative term which renders the language of the claims indefinite. The term "low active surface energy" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Use of the term "low active surface energy" renders the surface energy of the polymer compound indefinite.

Claim Rejections - 35 USC § 102 / 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 10-12, and 25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chang et al. (Appl. Phys. Lett. **51**(2), 13 July 1987).

Chang et al. teach a improving the adhesion between copper and polytetrafluoroethylene by pre-sputtering prior to copper deposition (see abstract). The PTFE corresponds to the polymer compound with a low active surface energy and the copper corresponds to the second material of claims 1 and 10. The pre-sputtering alters the surface morphology of the PTFE, resulting in a regularly textured surface with the height of the surface texture increasing with sputtering time (see paragraph bridging pages 104 and 105). The PTFE was pre-sputtered with 500 eV argon ions at times ranging from 10 seconds to over 5 min, including a time of about 1 min (see paragraph bridging columns of page 103 and Figure 1). This is the same substrate (PTFE) exposed to the same ions (Ar^+) at similar voltages and exposure times for depositing the same material (copper) as Example 1 of the instant application (see paragraph 0028 on page 7) leading to similar results (i.e. increased bond strength).

As the result of pre-sputtering under such conditions, one of ordinary skill in the art would expect the treatment conducted by Chang et al. to inherently result in a copper coated

PTFE substrate having the same morphology as that of instant Example 1 and thus meet the morphological and substrate:second material ratio limitations of instant claims 1 and 10. Alternatively, Chang et al. provides motivation to ensure that the heights of the surface texture are less that the depth formed at long times (e.g. less than a depth of several μm) since at such depths it becomes difficult for the copper layer to fill all the gaps (first paragraph on the left column of page 105) and peel strength is shown to decrease at longer sputtering times (Figure 1).

Thus one skilled in the art would expect the shorter sputtering times disclosed by Chang et al. to either intrinsically result in nano-scale textures or, alternatively, if such nano-scale textures were not inherently formed, one skilled in the art would be motivated to perform sputtering at shorter times to ensure the filaments are not so deep as to prevent the copper from filling the gaps as a means for increasing the strength of the bond.

Regarding claims 12 and 25, since the sputtering under the conditions taught by Chang et al. also result in the creation of radicals, the transition layer between the PTFE and the copper would be expected to have at least some PTFE that has reacted with the copper - i.e. at least some metal polymer.

Response to Arguments

8. Applicant's arguments filed 01 October 2010 have been fully considered but they are not persuasive.

Regarding the rejection of claims 1, 2, 10-12, and 25 because of the "low surface energy" language in independent claims 1 and 10, the applicants argue that it is a well recognized term of

art, citing 4920 hits among issued US patents. The applicants also argue that the term is clear based on its conventional definition.

This is not persuasive for the following reasons. First, that the phrase is mentioned in other US patents does not render the term definite in this application. For example, the term may be defined, explicitly or implicitly, in the other patents while there is no such definition in the instant application. Moreover, the conventional definition of the term does not render it clear since the term contains a relative term (i.e. "low") that is not defined, explicitly or implicitly, by the instant disclosure and there is nothing on the record establishing that one skilled in the at would be reasonably apprised of the scope of polymer compounds that would be encompassed by the term.

Regarding the rejection over Chang et al., the applicant argues that Chang et al. do not call for a preliminary step of nano-indentation prior to deposition but rather the morphology of the surface is disclosed during sputtering and not prior to sputtering.

This is not persuasive because Chang et al. explicitly call for "presputtering" that changes both the surface morphology and the interfacial chemical bonding. See, e.g. the abstract as well as the last paragraph of the first column of page 103 when the experimental procedure is discussed ("[p]rior to the deposition, the Teflon samples were either presputtered with 500 eV Ar+ ion, while others were not presputtered").

The applicant further argues that the sputtering process taught by Chang et al. alters the surface morphology by forming filaments whose height increases with sputtering time, reaching several micrometers at longer time. This is contrasted with the language of the claims explicitly

reciting the presence of nano-structures, which are defined as structures in the nano-meter range in contrast to and smaller than microstructures.

This is not persuasive because, while Chang et al. do teach that the regular textured surface will contain filament heights of several μm at longer sputtering times, there is no requirement that longer sputtering times be used. Chang et al teach sputtering times as short as 15 seconds which would be expected to result in significantly shorter heights. Additionally, Chang et al. teach away from using the longer sputtering times that would be expected to result in microstructures (and thus towards shorter times that would be expected to result in nanostructures) since it is difficult for the copper to fill the gaps of deeper filaments (e.g. see first paragraph on the left column of page 105) and peel strength is shown to decrease at longer sputtering times (e.g. see Figure 1). Thus one skilled in the art would expect the shorter sputtering times disclosed by Chang et al. to inherently result in nano-scale filaments. Alternatively, if such nano-scale filaments were not inherently formed, one skilled in the art would be motivated to perform sputtering at shorter times to ensure the filaments are not so deep as to prevent the copper from filling the gaps as a means for increasing the strength of the bond.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramsey Zacharia whose telephone number is (571) 272-1518. The examiner is working a part-time schedule and is periodically in the office.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho, can be reached at (571) 272-1123. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Ramsey Zacharia/

Primary Examiner, Art Unit 1794